

TITLE OF INVENTION

DATA RECORDING SYSTEM FOR STORING AS DATA THE CONTENTS OF
TELEPHONE CALLS MADE BY INTERNAL TELEPHONES AND BY MOBILE
5 TELEPHONES HAVING MEMORY CARD DATA STORAGE FUNCTION

BACKGROUND OF THE INVENTION

Field of Technology

The present invention relates to a data recording system for recording data transmitted via telephones, such as voice data, video data, etc. In particular the 10 invention relates to a data recording system whereby the contents of telephone communications performed using a mobile telephone and a public telephone network can be acquired by a telephone call recording apparatus and then 15 stored in a similar format to that applied to telephone calls performed using internal telephones which connect via a switchboard to the public telephone network.

Description of Prior Art

In recent years, types of telephone voice recording 20 system have been developed which apply VOIP (Voice Over IP) technology to transfer voice data over a computer network such as the Internet, and whereby the contents of a telephone call can be stored as data in a device such as a personal computer. These are typically telephone calls 25 which are made using internal telephones of a company or

institution, whose calls are switched via a local telephone switchboard of that company or institution to a public telephone network.

Furthermore, with the present-day rapid popularization of use of mobile telephones, business information interchange by using mobile telephones has started to be performed by individuals from locations which are distant from the offices or company premises of these individuals.

Moreover, with the popularization of mobile telephones, methods are being realized whereby data such as telephone numbers and other information which are held stored in a mobile telephone can be edited by using an appropriate user interface such as a personal computer. On the other hand, with the rapid increase in use of the Internet, standardized types of memory card interface have been developed for personal computers, and this has resulted in a lowering of the prices of memory cards.

In view of the above, there have been proposals to provide an interface for mounting a memory card in a mobile telephone, to thereby enable the data stored in a memory card to be used by both a personal computer and a mobile telephone. For example with Japanese patent HEI 11-74962, instead of being limited to the small amount of internal memory of a mobile telephone, a removable memory card is utilized to achieve an increase in the available memory

capacity of the telephone. It thereby becomes possible for the mobile telephone to store various types of data other than simply information such as telephone numbers.

Furthermore in the case of Japanese patent HEI 6-236316, an arrangement is proposed whereby various 5 different types of data communication devices, having respectively different types of formats for handling data, can operate in common on data stored on a memory card.

However with prior art types of telephone voice 10 recording system, the system is primarily directed towards recording the contents of telephone calls which are carried out using internal telephones (e.g., of a company or other institution). Such a system cannot be used to record the contents of telephone calls which are made using a mobile telephone via a public telephone network, i.e., without the 15 telephone call being switched through the internal telephone switchboard of the office.

Furthermore, with a prior art type of system which 20 applies the use of memory cards to mobile telephones, the emphasis is placed upon how to handle the data which are stored in the memory card, and no provision is made for providing an overall high degree of convenience and efficiency of utilization.

In the following description and in the appended 25 claims, the term "internal telephone" will be used to refer

to a conventional type of telephone (such as an internal telephone as mentioned hereinabove) which can be connected to a public telephone network either directly or via an internal telephone switchboard of a company or other institution, as opposed to a mobile telephone which communicates with a public telephone network by radio communication via a base station of a mobile telephone system.

Furthermore in the following description and in the appended claims, the term "voice data" of a telephone call will be used to refer to the contents of the voice communications exchanged between two telephones during that telephone call, expressed as a set of digital data, while the term "communication data" of a telephone call will be used to signify any other type of data contents, such as data expressing still or moving images which have been transmitted by a telephonic communication, in the case of a telephone having a video capability.

SUMMARY OF THE INVENTION

It is an objective of the present invention to overcome the above problems of the prior art, by providing a simple and efficient data recording system whereby the voice data or communication data contents of telephone calls which are made using a mobile telephone which communicates via a base station with a public telephone

network, can be acquired by a telephone call recording apparatus and then stored in the same manner as voice data or other data contents of telephone calls which are handled by internal telephones that connect directly to the public telephone network via a local switchboard.

Basically, the invention overcomes the prior art problems by providing a system whereby each mobile telephone is equipped to utilize a memory card as a removable data storage device. When a user of a mobile telephone makes (or receives) a telephone call which is transferred through a public telephone network, the contents of that telephone call (i.e., voice signal contents, expressed as a set of digital data, or communication data contents such as a set of digital data expressing still or moving images) are stored on a memory card, in conjunction with information relating to the opposite party in the telephone call such as the name of the opposite party etc., in a predetermined data record format which is identical to that utilized by the telephone call recording apparatus when recording the contents of telephone calls made by telephones which can be connected directly to that telephone call recording apparatus.

After completion of the telephone call, the telephone call data record which has been stored in the memory card is transmitted to the telephone call recording apparatus to be

stored thereby. Preferably, the system is configured such the memory card can be inserted into a computer such as a portable personal computer, and transmitted to the telephone call recording apparatus via a computer network.

5 More specifically, according to a first aspect, the invention provides a data recording system having internal telephones of a company or other institution, a telephone switchboard for performing switching of telephone call connections of the internal telephone, for connecting these telephones to a public telephone network, and a telephone call recording apparatus for recording communication data or voice data contents of telephone calls which are performed using the internal telephones. The system further includes mobile telephones each provided with interface means for connecting to a memory card, and further preferably includes computers which are utilized in conjunction with the mobile telephones and are each provided with memory card interface means, a computer network for relaying data between computers, and a gateway for relaying data from the telephone call recording apparatus to the computer network and for relaying data from the computer network to the telephone call recording apparatus. Each mobile telephone also includes internally stored information such as a telephone directory type of database which stores data (such as names, E-mail

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addresses, etc.) linked to respective telephone numbers of individuals or institutions which may engage in telephone calls with that mobile telephone. Each mobile telephone also includes means for storing in a memory card a

5 telephone call data record containing the communication data contents or voice data contents of a telephone call which is performed using that mobile telephone, and means for reading out a part of the internally stored information which relates to an opposite party of the telephone call, such as the name of that opposite party, and for inserting that information into the telephone call data record. At some convenient time following completion of the telephone call, the telephone call data record is read out from the memory card and transmitted to the telephone call recording apparatus, to be stored therein in the same way as data contents of telephone calls performed using the internal telephones.

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As a result, it becomes possible for a user to perform operations including recording, erasing and storing of contents of telephone calls made from a distant location using a mobile telephone, in the same manner as is applied to internal telephone calls.

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According to another aspect of such a system, the mobile telephone can be include means operable for

25 selectively recording the main points, i.e., most

important portions, of the contents of voice data or communication data of a telephone call. This is achieved by registering the start and end times of each main point (i.e., in response to user input commands such as 5 predetermined key actuations) in relation to the start of recording the contents of the telephone call. That is to say, each start point or end point of recording a main point of the telephone call contents is registered as an amount of time that has elapsed from the start of recording 10 the telephone call contents. These elapsed time values are stored in a telephone call data record on a memory card together with the recorded telephone call data contents, and so can be subsequently transmitted together with the telephone call data contents to the telephone call 15 recording apparatus. The telephone call recording apparatus can thereby extract the main point data portions from the entire telephone call data contents, without the need to actually transmit the data contents of the main points to the telephone call recording apparatus. In 20 addition, the mobile telephone includes means for extracting these main point data portions from the memory card data, after completion of the telephone call, and storing the main point data in an internal memory of the mobile telephone. The user of the mobile telephone can 25 thereby listen to or otherwise utilize the main point data

contents, with only a small amount of internal memory capacity being required to achieve that. In that way, the amount of data which must actually be transmitted from the memory card to the telephone call recording apparatus to 5 transmit the recorded main point contents is minimized, while in addition the internal memory capacity requirements of the mobile telephone are also minimized. Furthermore the user can act on the contents of the recorded telephone call more efficiently, since it becomes unnecessary for the 10 user to listen to the entire telephone call contents in order to recall the main points of the call contents. In addition, it becomes unnecessary to store non-essential data (i.e., the main point data contents, separate from the entire recorded telephone call data contents) in the memory 15 card.

According to another aspect of such a system, the system can be configured such that when a user of a mobile telephone inserts a memory card having a telephone call data record stored thereon into a computer that is 20 connected for communication with the telephone call recording apparatus, identifier information concerning that user and concerning the opposite party of the telephone call corresponding to that stored data record, together with information specifying the time at which the telephone 25 call contents started to be recorded, are transmitted to

the telephone call recording apparatus. The telephone call recording apparatus is provided with means for then determining whether there is a telephone call data record stored therein of a telephone call with that opposite party, which started to be recorded prior to that of the telephone call whose contents are stored on the memory card, then that telephone call data record which is being held stored at the telephone call recording apparatus is transmitted to the computer, to be stored in the memory card.

In that way, the user of the mobile telephone can always obtain the most up-to-date telephone call contents relating to a specific individual, such as a business client.

According to another aspect of the invention, when telephone call which is being made using a mobile telephone is transferred to an internal telephone, then the first part of that telephone call is recorded on a memory card and subsequently transmitted to the telephone call recording apparatus, while the telephone call recording apparatus records the second portion of the transferred telephone call, and subsequently combines these first and second portions, and stores the combined data as the contents of a single telephone call.

These and other aspects of the invention will become more apparent from the following description of preferred embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

5 Fig. 1 is a conceptual system block diagram of a first embodiment of a data recording system according to the present invention;

Fig. 2 is a system block diagram of a mobile telephone in the first embodiment;

10 Fig. 3 is a system block diagram of a telephone switchboard in the first embodiment;

Fig. 4 is a system block diagram of a telephone call recording apparatus in the first embodiment;

15 Fig. 5 is a system block diagram of a gateway in the first embodiment;

Fig. 6 shows an example of the format of a telephone call data record which is stored on a memory card, with the first embodiment;

20 Fig. 7 shows an example of a data directory arrangement for storing data of respective telephone calls in the telephone call recording apparatus of the first embodiment;

Fig. 8 is a system block diagram of a telephone call recording apparatus in a second embodiment;

Fig. 9 is a flow diagram of processing which is performed by the telephone call recording apparatus to judge the contents of a telephone call data record, with the second embodiment;

5 Fig. 10 is a system block diagram of a mobile telephone in a third embodiment;

Fig. 11 illustrates a series of data fields in which elapsed time values expressing positions of main points are stored, with the third embodiment;

10 Fig. 12 shows an example of the format of a telephone call data record of the third embodiment; and

Fig. 13 shows an example of indication information that is generated on a mobile telephone display device of a mobile telephone in the third embodiment; and

15 Figs. 14, 15 respectively show a telephone call recording apparatus and an example of a telephone call data record format, for a fourth embodiment.

DESCRIPTION OF PREFERRED EMBODIMENTS

First Embodiment

20 Fig. 1 is a conceptual system block diagram showing the overall configuration of a first embodiment of a data recording system. This system includes a plurality of mobile telephones 101 (with only one of these being represented in the drawing) each provided with an interface 25 for performing voice communications via a radio link to at

least one base station 102 and an interface for connecting to a memory card 110. Each of the base stations 102 transmits radio waves to communicate with and supervise all mobile telephones 101 that are within the service area of that base station, and provides a line switching function (i.e., a call connection function) to each of the mobile telephones 101 that is supervised thereby. The system further includes a public telephone network 103 which performs line switching operations for the plurality of base stations 102, and which also performs line switching operations for a plurality of external telephones 111 (with only one of these being shown in the drawing) and a switchboard 104 which performs line switching operations between the public telephone network 103 and each of a plurality of internal telephones 105 (with only one of these being shown in the drawing). It should be understood that the term "internal telephone" as used in the following description and appended claims refers to one of a set of telephones which connect via the same local switchboard to a public telephone network. The system further includes a telephone call recording apparatus 106, for recording the contents of voice telephone calls or other types of data communications performed using the internal telephones 105 and for storing the recorded data. The system also includes a gateway 107 which functions as an interface for

transferring data that have been recorded by the telephone call recording apparatus 106 to a computer network 108, and for transferring data received from the computer network 108, to be recorded by the telephone call recording apparatus 106. The computer network 108 serves as a data communication interface between the gateway 107 and a plurality of personal computers 109 (with only one of these being shown in the drawings). Each computer 109 is connected to the computer network 108 for data transfer, and is provided with an interface (not shown in the drawing) for utilizing a memory card 110, i.e., into which a memory card 110 can be inserted and connections made thereto, and the data stored in the memory card 110 thereby accessed. It should be understood that the "telephone 111" shown in Fig. 1 conceptually represents any telephone (fixed-line or mobile) other than the mobile telephone 101 or the internal telephones 105, which can establish a communication connection via the public telephone network 103. Each mobile telephone 101 contains an internal memory (not shown in the drawing). Each memory card 110 is a read/write type of memory card, with data that are written into/read out from the memory card being obtained from or supplied to the internal memory of a mobile telephone 101 when the memory card 110 has been inserted into that mobile telephone 101, or obtained from or supplied to a computer

109, when the memory card 110 has been inserted into that computer 109.

For simplicity of description it will be assumed in the following that each memory card 110 stores a single telephone call data record, containing telephone call data of a single call, with the user of the memory card 110 (i.e., the recording individual) and the opposite party in the telephone call being respectively identified in some manner within the telephone call data record. However the invention is not limited to the use of such a format for storing telephone call data contents on a memory card.

As shown in Fig. 2, the mobile telephone 101 includes a memory card connection interface 201 for mounting a memory card 110 (i.e., for insertion and connection, as described hereinabove), a radio communication section 202 which serves as an interface with a base station 101, a mobile telephone control section 203 which controls the overall operation of the mobile telephone 101, a telephone call recording section 204 for recording and storing the contents of telephone calls as voice data, an audio input section 205 having a telephone microphone, etc., an audio output section 206 having a telephone loudspeaker, etc., a recorded voice data - telephone directory database linkage section 207 for linking the contents of a telephone call recorded by the telephone call recording section 204 with

the telephone number of the opposite party in that telephone call and predetermined data such as identifier information concerning that opposite party, with a list of data relating respective telephone numbers to such 5 identifier information for potential opposite parties being held stored in a recorded voice data - telephone directory database 208. That is to say, the recorded voice data - telephone directory database 208 has stored beforehand therein a list of telephone numbers of individuals or 10 institutions who may potentially become opposite parties in telephone calls performed by the user of that mobile telephone, with each telephone number associated with a set of information such as a name, etc., which identifies that potential opposite party, or other information concerning 15 that individual or institution. In particular, the recorded voice data - telephone directory database 208 can have stored beforehand therein (in conjunction with the respective telephone numbers of business clients) 20 identification information or electronic mail addresses of clients, in the case of a mobile telephone which is used for business purposes. The mobile telephone 101 further includes a display device 209, and dialing keys 210 for use in inputting data such as telephone numbers and commands for controlling operation of the mobile telephone.

As shown in Fig. 3, the switchboard 104 is formed of a public telephone network communication control section 301 which performs control of communication via the public telephone network 103, an internal telephone communication control section 302 which performs communication control of the internal telephone 105, a telephone call recording apparatus communication control section 303 which performs communication control of the telephone call recording apparatus 106, and a public telephone network communication control section 304 which performs overall control of the telephone switchboard 104.

As shown in Fig. 4, the telephone call recording apparatus 106 is formed of a switchboard communication control section 401 which performs control of communication via the switchboard 104k, a gateway communication control section 402 which performs communication control of the gateway 107, a telephone call recording section 403 for recording the contents of telephone calls which are made by an internal telephone 105 and for storing the call contents as a data record, and a telephone call recording apparatus control section 404 which performs overall control of the telephone call recording apparatus 106.

As shown in Fig. 5, the gateway 107 is formed of a computer network communication control section 501 which performs control of communication via the computer network,

a telephone call recording apparatus communication control section 502 which perform communication control of the telephone call recording apparatus 106, and a public telephone network communication control section 503 which performs overall control of the gateway 107.

The operation of this data recording system embodiment is as follows. Firstly, the operation for recording the contents of a telephone call made using an internal telephone 105 (i.e., a telephone call which is handled by an external telephone 111 and the switchboard 104) and for storing the recorded contents by the telephone call recording apparatus 106, will be described. When a telephone call is to be made from an external telephone 111 to an internal telephone 105, the external telephone 111 initiates the call by sending the telephone number of the switchboard 104 to the public telephone network 103, which then sends a notification (i.e., as an electrical signal) of this call to the switchboard 104. When the switchboard 104 receives this notification, the telephone call recording apparatus communication control section 503 of the switchboard 104 controls the internal telephone communication control section 302 such that the appropriate one of the internal telephones 105 (i.e., a telephone whose number has been assigned to a specific individual, as described in the following) is notified that a call has

been received. A user then sets that internal telephone 105 in the off-hook condition, whereupon the public telephone network communication control section 304 of the switchboard 104 controls the public telephone network communication control section 301 such as to establish a communication path between the calling external telephone 111 and that internal telephone 105. At this time, the public telephone network communication control section 304 receives identification information such as the telephone number of the calling external telephone 111, from the public telephone network 103, and records that information.

If it is required to record the contents of the telephone call, the user actuates a predetermined operating key (not shown in the drawing) of the internal telephone 105 to thereby send a "telephone call recording start" request to the internal telephone communication control section 302 of the switchboard 104. When the public telephone network communication control section 304 detects that this request has been received, it sends a "telephone call recording start" instruction to the telephone call recording apparatus communication control section 303, and also notifies the telephone call recording apparatus communication control section 303 of the information necessary for specifying the calling party (e.g., information such as the telephone number of the calling

external telephone 111) and also notifies the telephone call recording apparatus communication control section 303 of any identification information (such as the internal telephone number of the internal telephone 105 to which this call has been connected) that may be required for specifying the individual who is receiving the call.

A "telephone call recording start" instruction is then sent from the telephone call recording apparatus communication control section 303 to the telephone call recording apparatus 106, and is received by the telephone call recording apparatus control section 404 of the telephone call recording apparatus 106 via the switchboard communication control section 401. The telephone call recording apparatus control section 404 sends the "telephone call recording start" instruction to the telephone call recording section 403, and also notifies the telephone call recording section 403 of information such as the internal telephone number of the internal telephone 105 to which the call is being connected, e.g., to identify the person who is receiving the call, and information such as the telephone number of the external telephone 111, to specify the calling individual. The telephone call recording section 403 of the telephone call recording apparatus 106 then begins to record the telephone call contents, and to store these as a data record.

Fig. 7 shows an example of the format of a data directory structure for storage of telephone call data that have been recorded by the telephone call recording section 403. In Fig. 7, 701 denotes a root directory, 702, 5 706, 710 are directories of respective users, with each user being assigned the telephone number of a predetermined corresponding one of a plurality of internal telephones 105. It will be assumed that the switchboard 104, telephone call recording apparatus 106 and each of the 10 internal telephone 105 are located within a company, with the aforementioned users being respective staff members of that company, and that 703 to 705, 707 to 709, and 711 to 713 are respective sets of directories of clients of that company, with these sets of client directories respectively 15 corresponding to the various users, who are indicated in Fig. 7 as "user A", "user B" etc. Each of the clients (respectively indicated in Fig. 7 as "client A", "client B", etc.,) can for example be identified within the data directory structure by the telephone number and name of 20 that client.

When the telephone call recording is to be ended, the user of the internal telephone 105 which is handling the call actuates a predetermined operating key (not shown in the drawing) whereby a "telephone call recording end" 25 request is sent from that internal telephone 105 and

transferred to the telephone call recording section 403 of the telephone call recording apparatus 106 via the same path as that over which the "telephone call recording start" request was sent. Telephone call recording is thereby terminated.

Next, the operation will be described whereby the contents of a telephone call made between a mobile telephone 101 and an external telephone 111 are recorded using a memory card 110, and the contents of that telephone call then stored as data in the telephone call recording apparatus 106. It will be assumed that that the user of an external telephone 111 is the calling party, in which case that external telephone 111 first transmits the telephone number of the called mobile telephone 101 to the public telephone network 103. The mobile telephone control section 203 of the called mobile telephone 101 then receives notification (via a base station 102, and the radio communication section 202 of that mobile telephone 101) from the public telephone network 103 that a telephone call is being received, and the mobile telephone control section 203 then notifies the mobile telephone user of the incoming call, such as by sending a signal whereby a dialing tone is audibly emitted by the audio output section 206. When the user then sets the mobile telephone in the off-hook status (e.g., by actuation of a predetermined one

of the dialing keys 210) a communication path is
established between the mobile telephone 101 and the public
telephone network 103. At this time, the mobile telephone
control section 203 receives from the public telephone
5 network 103 the telephone number of the calling external
telephone 111, and stores that telephone number for use in
identifying the opposite party.

If the contents of this telephone call are to be
recorded, then the user of the mobile telephone 101
10 actuates a specific key, e.g., a predetermined one of the
dialing keys 210, whereby a "telephone call recording
start" request is sent to the mobile telephone control
section 203. When the mobile telephone control section 203
detects that this "telephone call recording start" request
15 has been sent, it sends a "telephone call recording start"
instruction to the recorded voice data - telephone
directory database linkage section 207, and also notifies
the recorded voice data - telephone directory database
linkage section 207 of the telephone number of the calling
20 external telephone 111. When the recorded voice data -
telephone directory database linkage section 207 receives
the "telephone call recording start" instruction, it
acquires from the recorded voice data - telephone directory
database 208 more detailed information concerning the
25 calling party who is using the external telephone 111, if

such information has been already stored within the recorded voice data - telephone directory database 208. Such information can for example be a name or other identifier information concerning a client as mentioned above, or the electronic mail address of a client, etc. The recorded voice data - telephone directory database linkage section 207 then supplies this information to the telephone call recording section 204. When the telephone call recording section 204 receives this information concerning the calling party, the information is also transferred via the mobile telephone control section 203 and memory card connection interface 201 to be stored in the memory card 110, and the telephone call recording section 204 then acquires the voice signals of the telephone call, from the audio input section 205 and the audio output section 206, and begins to record the telephone conversation contents as voice data. These voice data (or other data contents of the telephone call) are transferred to the memory card 110 via the mobile telephone control section 203 and the memory card connection interface 201, and stored in the memory card 110. An internal memory of the telephone call recording section 204 (not shown in the drawing) may be utilized for intermediate storage of the telephone call data contents, in this process.

When the telephone call recording is to be ended, this is initiated by the user actuating a specific key, e.g., a predetermined one of the dialing keys 210, whereby a "telephone call recording end" request is supplied from the dialing keys 210 to the mobile telephone control section 203. When the mobile telephone control section 203 detects that this request has been received, it supplies a the "telephone call recording end" instruction to the telephone call recording section 204, whereby recording of the telephone call is terminated.

Fig. 6 shows an example of the format of a telephone call data record which is stored on a memory card, containing the contents of a telephone call made by a mobile telephone 101. In Fig. 6, 601 denotes a recording individual identifier field of that data record, which contains identifier information that specifies the user of the mobile telephone 101 from which these telephone call data have been loaded into the memory card, such as the telephone number assigned to the mobile telephone, the name of the user and/or other identification information concerning the user. 602 denotes an opposite party identifier field, which contains information specifying the opposite party in the telephone call, such as the name, client identifier, or electronic mail address, etc., of the opposite party, read out from the recorded voice data -

telephone directory database 208 by the recorded voice data - telephone directory database linkage section 207 as described by utilizing the telephone number of that opposite party. 603 denotes an opposite party telephone number field, containing the telephone number of the opposite party. 604 denotes a telephone call starting time field which contains the year, date and time of day at which recording of the telephone call was started, with these data being written in by the mobile telephone control section 203 of the mobile telephone 101. 606 denotes a telephone call end time field, containing the year, date and time of day of termination of the telephone call recording. Numeral 606 denotes a data classification field which contains information specifying the type of encoding that was used in recording the telephone call contents and storing these as data, such as the CODEC type, and any other information which may be required in order to decode or decompress the stored telephone call data contents or to transfer these data to be stored in some other form of data storage medium. The information in the data classification field 606 are also written in by the mobile telephone control section 203. Numeral telephone call contents field 607 denotes a call contents recording field, containing data (in this example, assumed to be voice data) constituting the actual recorded telephone call contents.

In that way, the contents of the telephone call carried out between an external telephone 111 and a mobile telephone 101 are stored as data on a memory card 110.

When the memory card 110 having telephone call voice data recorded therein is then inserted into a computer 109 to be connected thereto, the computer 109 reads out the telephone call data record that has been stored in the memory card 110, and transmits its contents to the computer network communication control section 501 of the gateway 107, via the computer network 108. This operation may for example be initiated by the user performing predetermined keyboard input operations on the computer 109 when the memory card 110 has been inserted therein

The public telephone network communication control section 503 of the gateway 107 converts the data encoding format of the telephone call contents field 607 from that specified in the data classifier field 606 to a type which is suitable for use by the telephone call recording apparatus 106, with the public telephone network communication control section 503 utilizing the information contained in the data classifier field 606 to perform that format conversion. The public telephone network communication control section 503 then controls the telephone call recording apparatus communication control section 502 of the gateway 107 to transmit the resultant

format-modified telephone call data record to the gateway communication control section 402 of the telephone call recording apparatus 106.

The telephone call recording apparatus control section 404 of the telephone call recording apparatus 106 then controls the telephone call recording section 403 to store the received telephone call data record in one of the client data directories (e.g., one of the set 702, 703 etc., or the set 707, 708, etc.) shown in Fig. 7 and described above, i.e., to a data directory assigned to a client who corresponds to the opposite party identified in that telephone call data record, with that client data directory being within a user data directory that corresponds to the user who has transmitted that telephone call data record. This allocation of the telephone call data record to a specific data directory is performed by the telephone call recording apparatus control section 404 based on the contents of the recording individual identifier field 601 and the contents of at least one of the opposite party identifier field 602 and opposite party telephone number field 603.

In that way, with this system embodiment, the data stored in a memory card can be recorded by the telephone call recording apparatus, in the same way as the contents of a telephone call carried out between an external

telephone and an internal telephone. As a result, the
contents of a telephone call which is performed by an
individual using a mobile telephone and is linked to a
public telephone network via a base station of the mobile
5 telephone system while that individual is at a remote
location, can be recorded and can be subsequently listened
to, saved, deleted, etc., in the same way as the contents
of a telephone call which is performed by that individual
at a usual location (i.e., the place of business of that
10 individual) using an internal telephone which is linked to
the public telephone network via a telephone switchboard at
that location.

Referring to Fig. 7 for example, irrespective of
whether user A receives a telephone call from client A
15 (i.e., received by an internal telephone 105 that is
assigned to user A, and sent from client A by using an
external telephone 111) while user A is situated at his or
her place of business, or that telephone call is received
by the mobile telephone of user A while he or she is at a
20 remote location, the contents of that telephone call can
be recorded and stored in the data directory corresponding
to client A, within the user data directory corresponding
to user A, in the telephone call recording section 403 of
the telephone call recording apparatus 106. In either
25 case, the telephone call contents will be stored in the

same way, i.e., as part of a telephone call data record which can also contain various types of information relating to client A. It will be apparent that this capability is extremely valuable and useful to such a type 5 of mobile telephone user.

In the above, a description has been given for the case in which a telephone call is recorded when the call is made (i.e., initiated) from an external telephone 111 to a mobile telephone 101. However, the same type of 10 operation can be achieved for the case in which a telephone call is made from a mobile telephone 101 to an external telephone 111.

Also in the above, the description has been given for the case in which the data stored in a memory card are 15 transferred to the telephone call recording apparatus via a personal computer, computer network and a gateway. However it would be equally possible to arrange to transfer these data from the mobile telephone, i.e. via the base station 102 of the mobile telephone system, the public telephone 20 network 103, and the internal switchboard 104, to a telephone call recording apparatus such as the telephone call recording apparatus 106, with the telephone call recording apparatus 106 having been configured to receive such data transferred via the switchboard 104.

The above embodiment has been described above for the case in which only telephone call voice data are stored and are linked to identification information, by using memory cards and a telephone call recording apparatus. However

5 the embodiment could equally be utilized for the storage (and linkage to identification information) of communication data, i.e., non-voice data such as data expressing still pictures and/or moving pictures, for application to telephones having a video display capability

10 and a video data transmission function.

Furthermore with the above embodiment, a telephone call data record that is transmitted from a memory card to the telephone call recording apparatus 106 includes a recording individual identifier fields, an opposite party identifier field, and an opposite party telephone number field, whose respective contents are used by the telephone call recording apparatus 106 to assign the data contents of that telephone call to an appropriate storage location, e.g., in one of the client data directories shown in Fig.

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20 7. Thus, the telephone call recording apparatus 106 could readily be configured to compare the contents of these fields, when a telephone call data record is transmitted from a memory card, with the contents of a telephone directory database that is used by the telephone call recording apparatus 106, e.g., which is stored in the

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telephone call recording section 403 shown in Fig. 4. The contents of that telephone directory database could then be updated with the contents of these data fields of the received telephone call data record, i.e., by transferring 5 the contents of the opposite party identification field and opposite party telephone number field from the memory card, if the information contained in these fields is not yet held in that telephone directory database of the telephone call recording apparatus 106. In that way, it can be 10 ensured that the telephone call recording apparatus 106 always contains up-to-date telephone directory information concerning individuals or institutions such as business clients, who are potential opposite parties in telephone 15 communications with the users of the telephone call recording apparatus 106.

Second Embodiment

A second embodiment of the invention will be described whereby specific recorded telephone call data stored in a telephone call recording apparatus can be transferred to a 20 memory card that is utilized with a mobile telephone, but whereby unnecessary transfer of such data is eliminated..

The overall configuration of the system (Fig. 1), the configuration of a mobile telephone 101 (Fig. 2), the configuration of a switchboard 104 (Fig. 3), the 25 configuration of a gateway 107 (Fig. 5), the data format of

the memory card 110 (Fig. 6), and the directory arrangement for storing telephone call voice data in the telephone call recording apparatus 106 (Fig. 7), with this embodiment, are respectively identical to those of the first embodiment so that detailed description will be omitted. For ease of description of this embodiment, it will be assumed that the telephone call recording apparatus 106 is located at a business office and that the users of the mobile telephones 101 are respective staff members of that business. It will be further assumed that each memory card 110 is required to always have stored therein, for each of a plurality of clients who are assigned to the user of that memory card 110 (such as clients A, B, C of user A in the directory example of Fig. 7) the data of the most recent telephone call that has been exchanged with that client through use of the mobile telephone 101 which is assigned to that user or use of the internal telephone 105 which is assigned to that user. It should be noted that with this embodiment the telephone call recording apparatus 106 is configured such that, when an individual other than the user to which an internal telephone 105 is assigned answers a telephone call that is received by that telephone 105 (e.g., when the assigned user is at a remote location), and that individual inputs a request to the telephone call recording apparatus 106 for recording of the contents of that call, the

telephone call recording apparatus 106 will store the data contents of that telephone call in the appropriate client data directory within the user data directory of the user who is assigned that internal telephone 105. For example
5 referring to Fig. 7, if user B receives a telephone call from client A of user A at the telephone 105 which is assigned to user A, then if user B designates to the telephone call recording apparatus 106 that the call contents are to be recorded, the data of that telephone
10 call will be stored in the client A directory within the user A directory.

Furthermore with this embodiment, referring to the client directories 703 to 713 shown in Fig. 7, if there are a plurality of telephone calls that are currently
15 registered in a client data directory (i.e., a plurality of telephone calls which have been successively exchanged with that particular client), then the recorded data of one of these telephone calls is registered with a data status (e.g., in a specific field of the stored telephone call
20 data record of that call) referred to in the following as the "most recent call" status, which specifies that this is the most recent telephone call to have been exchanged with that client. All other telephone call data records are registered with a "previous call" status.

Fig. 8 shows the configuration of the telephone call recording apparatus 106 of this embodiment. This is formed of a switchboard communication control section 801 which performs control of communication via the switchboard 104, 5 a gateway communication control section 802 which performs communication control of the gateway 107, a telephone call recording section 803 for applying data recording to the internal telephone 105 and for storing the resultant telephone call data records, a telephone call recording apparatus control section 804 which performs overall 10 control of the telephone call recording apparatus 106, and a telephone call data judgement section 805 which judges the relationship between recorded voice data stored in the memory card 110 and recorded voice data which have been 15 stored in the telephone call recording apparatus 106.

The operation of the telephone call recording apparatus 106 of this data recording system will be described referring to the simple flow diagram of Fig. 9, assuming that telephone call data are stored in the 20 telephone call recording apparatus 106 using the directory arrangement shown in Fig. 7, that a mobile telephone 101 is being used by user A of the directory example shown in Fig. 7, and that recently recorded voice data of a telephone 25 call made between that mobile telephone 101 and one of the clients of user A have been stored in the memory card 110,

and the memory card 110 has then been inserted into a computer 109. It will further be assumed that the voice data have been recorded in the memory card 110 using the data format shown in the example of Fig. 6.

5 When the memory card 110 is extracted from the mobile telephone 101 and inserted into the computer 109, the computer 109 of this embodiment then sends a memory card insertion notification to the telephone call recording apparatus control section 804, via the gateway 107 and the 10 gateway communication control section 802, together with the contents of the recording individual identifier field 601, the opposite party identifier field 602 and the 15 telephone call start time field 604 of the telephone call data record stored in memory card 110. When the telephone call recording apparatus control section 804 receives this 20 notification that a memory card has been inserted, it controls the telephone call data judgement section 805 to perform judgement processing of data already stored within the telephone call recording section 803 and parts of the data held in the memory card 110, as follows. Firstly (step 900 in Fig. 9) the telephone call data judgement section 805 examines the contents of the recording individual identifier field 601 of the memory card 110, to thereby identify the user of the memory card 110, assumed 25 in this case to be user A, corresponding to the "user A"

directory 702 in the telephone call recording section 803. Next, step 901 is performed, to identify the opposite party in the recorded telephone call, from the contents of the opposite party identifier field 602. A comparison 5 judgement step 902 is then performed between the identification information thus obtained (e.g., a client name) and the identities of the clients in the user A directory. It will be assumed for example that the opposite party in the telephone call is client A, i.e., 10 matches the "client A" directory 703 within the "user A" data directory.

If at that time there is a set of recorded telephone call data relating to the client A already stored within the telephone call recording section 803, which has been 15 assigned the aforementioned "most recent call" status to designate it as the most recent to have been exchanged with client A, then (step 903) the telephone call data judgement section 805 compares the contents of the telephone call start time field 604 of the recorded 20 telephone call data from memory card 110, i.e., data specifying the time at which recording of that telephone call was started by the mobile telephone 101, with the time at which recording of the call data contents of the telephone call data record having the "most recent call" 25 status was started (with the latter starting time

information being obtained from the telephone call recording section 803). If it is found as a result of this judgement that the recording start time of that "most recent call" recorded telephone call data held in the 5 telephone call recording section 803 is subsequent to the recording start time specified in the telephone call start time field 604 of the memory card 110, then this is taken as signifying that any necessary actions relating to the contents of that telephone call have not yet been taken by 10 user A, since user A has not yet responded to the most recent telephone call from that client. Hence, it is necessary to transmit that "most recent call" telephone call data record relating to client A from the telephone call recording section 803 to the memory card 110. Hence, 15 when such a condition is detected (in step 903 of Fig. 9) the telephone call data judgement section 805 sends to the telephone call recording apparatus control section 804 a request for the recorded telephone call data having the status "most recent call" in the "client A" directory of 20 the telephone call recording section 803 to be transmitted to the memory card 110 of user A. In response, the telephone call recording apparatus control section 804 sends a data transmission instruction to the telephone call recording section 803 (step 905 in Fig. 9) whereupon the 25 telephone call recording section 803 transmits the

requisite recorded telephone call data to the memory card 110 via the gateway communication control section 802, gateway 107, the computer network 108, and the computer 109.

5 In that way, when that memory card 110 is then re-inserted into the mobile telephone 101 of user A, user A is provided with the most up-to-date telephone call contents relating to client A, and can then listen to these call contents and take any necessary action based on these

10 contents.

Conversely, if it is found in step 903 that the start 15 of recording the telephone call data relating to client A which are held in the memory card 110 is subsequent to the start of recording the aforementioned recorded telephone call data having the "most recent call" status in the "client A" directory, it will be judged that some action 20 (for example, such as responding to a query from client A) has already been taken by user A, i.e., through the most recent telephone call which has been exchanged between user A and client A by using the mobile telephone 101. This signifies that:

(a) there is no need for the aforementioned telephone call data record which is currently registered with the "most recent call" status in the "client A" directory to 25 be transferred to the memory card 110 of user A, and

(b) that telephone call data record should no longer have the "most recent call" status.

When (step 905 in Fig. 9) the telephone call data judgement section 805 notifies the telephone call recording apparatus control section 804 of this condition, the telephone call recording apparatus control section 804 controls the telephone call recording section 803 to perform processing to remove the "most recent call" registered status and assign a "previous call" registered status to that telephone call data record corresponding to client A in the user A data directory, and does not transmit that data record to the computer 109 to be stored in the memory card 110.

Thus with this embodiment, when a memory card 110 is inserted into a computer 109, the memory card 110 is updated with the most recent telephone call data record (held in the telephone call recording section 803 of the telephone call recording apparatus 106) for the opposite party who is identified in that memory card 110 (i.e., in field 602) only if it is actually necessary to perform that updating, as determined by whether or not that data record held in the telephone call recording section 803 was recorded prior to the aforementioned telephone call data record that is currently stored in the memory card 110 and is registered with the "most recent call" status. That

is to say, if the user of the memory card 110 has already contacted the aforementioned opposite party, it can be assumed that there is no need for the user to receive and process the telephone call data record relating to that opposite party which is held in the telephone call recording section 803. Hence, the transfer of unnecessary telephone call data for updating the contents of the memory card 110 can be eliminated, and the user need only operate on telephone call data which are actually necessary, thereby increasing efficiency.

In the above description it has been assumed that the act of inserting a memory card 110 into a computer 109 results in a signal being automatically sent to notify the telephone call recording apparatus 106 that such insertion has occurred and that it is required to begin the updating processing operations of the second embodiment, if appropriate, as described above. However in practice of course, it could readily be arranged that this notification occurs when the user performs predetermined key actuations of the computer 109 after inserting the memory card 110.

Third Embodiment

A third embodiment of a data recording system according to the present invention will be described in the following, whereby a mobile telephone can perform recording of main points of a telephone call (where the term "main

points" is used herein to signify respective essential portions of the contents of a telephone call, which constitute the gist of the call contents), enabling each of these main points to be listened to or operated on by the 5 user of the mobile telephone after recording of the telephone call has been completed, and whereby these main points can subsequently be transmitted to and stored by a data recording apparatus, in conjunction with the entire recorded contents of the telephone call, but with a minimum 10 of data requiring to be actually transmitted.

As a specific example of such "main points", if a business conversation is in progress, a point may be reached in that conversation at which important conditions such as the terms of a contract begin to be discussed, 15 with that matter being the essential part of the conversation.

The overall configuration of this data recording system is as described for the first embodiment and shown in Fig. 1, with the main point recording function of this 20 embodiment being supplemental to the telephone call recording functions of the first embodiment described hereinabove.

As shown in Fig. 10, a mobile telephone of this embodiment includes a memory card connection interface 201, 25 serving as an interface for mounting a memory card 110, a

radio communication section 202 which serves as an interface with a base station 101, a mobile telephone control section 1003 which controls the overall operation of the mobile telephone 101, a telephone call recording section 204 for recording and storing the contents of telephone calls, an audio input section 205 having a telephone microphone, etc., an audio output section 206 having a telephone loudspeaker, etc., a recorded voice data - telephone directory database 208 which stores the names, telephone numbers, identification information, electronic mail addresses, etc., of opposite parties in telephone calls, and a recorded voice data - telephone directory database linkage section 207 for linking the contents of a telephone call recorded by the telephone call recording section 204 with predetermined information in the recorded voice data - telephone directory database 208, such as the telephone number of the opposite party in that telephone call or identification information concerning that opposite party. The mobile telephone 101 further includes a display device 1009, and dialing keys 1010 for use in inputting data such as telephone numbers. Each of the memory card 110, radio communication section 202, radio communication section 202, telephone call recording section 204, audio input section 205, audio output section 206, recorded voice data - telephone directory database linkage section

207 and recorded voice data - telephone directory database
208 can be identical in operation to the respective
correspondingly numbered sections of the mobile telephone
of the first embodiment, having the configuration shown in
5 Fig. 2. The mobile telephone of the third embodiment
differs by further including the main point recording
section 1011 and main point data storage section 1012, and
in that additional functions are performed by the mobile
telephone control section 1003, display device 1009 and
10 dialing keys 1010 of this embodiment, and also in that the
format of a telephone call data record stored in the memory
card 110 is modified from that of the first embodiment, as
described hereinafter.

With the mobile telephone of this embodiment, the
15 display 1009 is provided with a function for indicating
that recording of a main point of telephone call is in
progress. Furthermore, in addition to serving for input of
telephone numbers, a predetermined actuation of the
dialing keys 1010 serves to input to the mobile telephone
20 control section 1003 a command for starting the recording
of a main point, and to input a subsequent command to
ending that recording. The mobile telephone further
includes a main point recording section 1011 for performing
recording of the main points of a telephone call, at
25 timings in accordance with inputs supplied from the dialing

keys 1010. Specifically, the main point recording section 1011 registers respective amounts of time which elapse from the start of recording a telephone call until the start and end time points of each of the recorded main points of the 5 telephone call. The mobile telephone further includes a main point data storage section 1012 for extracting the recorded voice data of the main points, from the contents of the memory card 110, in accordance with the values of elapsed time from the start of the telephone call, (i.e., 10 the elapsed time values which have been successively registered by the main point recording section 1011) and for storing the respective sets of main point voice data which have been extracted from the memory card 110, when 15 recording of the telephone call contents has been completed.

In the following, only the operation whereby the main point recording section 1011 records the main points of a telephone call (while recording of the data contents of the telephone call itself is in progress, as described for the 20 first embodiment) and whereby the data of these main points can be subsequently acquired by the telephone call recording apparatus 106, will be described referring to Figs. 10 to 13. While a telephone call utilizing the 25 mobile telephone 101 is being performed, if the user of the mobile telephone decides that a main point of the telephone

call contents has been reached, then the user actuates the dialing keys 1010 in a predetermined manner to input a command to begin recording that main point. The mobile telephone control section 1003 detects this actuation, and 5 notifies the main point recording section 1011 of that, while also notifying the main point recording section 1011 of the length of time which has elapsed (up to that point) from the start of recording the telephone call.

The main point recording section 1011 registers 10 respective times corresponding to the start and end points of successive main points of a telephone call by using the format shown in Fig. 11, which consists of a series of data fields, referred to in the following as main point record fields, within a main point recording field of a telephone 15 call data record stored in the memory card 110 (as shown in Fig. 12 and described hereinafter). When the aforementioned predetermined actuation of the dialing keys is performed for the first time after the start of recording a telephone call, the main point recording 20 section 1011 registers in the main point record field 1, designated by numeral 1101, the time that has elapsed since the start of recording the telephone call. Thus the contents of that time record 1101 indicate the start of recording the first main point. When the aforementioned 25 actuation of the dialing keys 1010 is subsequently again

performed, the main point recording section 1011 registers in a main point record field 2, designated by numeral 1102, the time that has elapsed since the start of recording the telephone call. Thus the contents of the time record 1102

5 indicate the end of recording the first main point.

10

Thereafter, the main point recording section 1011 similarly records in the main point record fields 3, 4, etc., the successive amounts of time which have elapsed between the start of the telephone call and the time points at which the aforementioned predetermined actuation of the dialing keys 1010 is performed. While this is being done, the telephone call recording section 204 is not required to perform any special processing for the purpose of recording the main points, but operates as described hereinabove for

15

the first embodiment.

20

As these elapsed time values are successively registered in the main point record fields of the main point recording section 1011, they are also similarly registered within in a main point recording time field in the memory card 110, or are registered therein after completion of recording the call contents, as described hereinafter.

25

When recording of the telephone call is ended, the main point recording section 1011 notifies the main point data storage section 1012 that respective portions of the

recorded voice data of that conversation are to be transferred from the memory card 110 to the main point data storage section 1012, with these voice data portions being determined in accordance with the contents of the main point record fields shown in Fig. 11, and the main point data storage section 1012 then receives and stores these voice data portions. The user can now use the dialing keys 1010 to input commands for reading out the data of desired ones of these main points, to be listened to, modified or erased.

It can be understood that the storage capacity required for the main point data storage section 1012 can be much less than would required if the entire data contents of the telephone call were to be stored therein. It can also be understood that with the operation described above, when recording of main points is performed during recording of a telephone call, the telephone call recording section 204 operates only to continuously record and store the telephone call data contents, without being required to perform any special processing to record the main points.

Fig. 13 shows an example of information which is displayed by the display device 1009 of this embodiment while recording of main points is being performed by the mobile telephone. As illustrated, the operation of recording main point data of a telephone call can be

linked to identification information (e.g., name) of the opposite parties in that call. In the example of Fig. 13 the display section 1009 generates, a name display 1302 in conjunction with main point recording marker symbols 1301, 5 so that while a telephone call is in progress, the user of the mobile telephone can confirm that recording of main points is being performed, as indicated by a recording marker symbol being displayed beside the name of the opposite party in the telephone call.

10 When the recorded telephone call data, and the recorded main point data, are to be transmitted from the mobile telephone 101 to the telephone call recording apparatus 106, the following operations are performed. Fig. 12 shows the format in which a telephone call data record is stored in the memory card 110 with this 15 embodiment. In Fig. 12, numeral 1207 denotes a main point recording time field, having the format shown in Fig. 11, i.e., containing a number of main point record fields into which time values are successively written, each defining a 20 time duration that has elapsed from the start of the telephone call as described above referring to Fig. 11. The remaining fields shown in Fig. 12 are respectively identical to the correspondingly designated fields shown in Fig. 6, for the memory card 110 of the first embodiment.

Recorded telephone call data having the format described for the above example are transferred from the memory card 110 to the telephone call recording apparatus 106. The telephone call recording apparatus 106 of this embodiment includes a section (not shown in the drawings) which performs the functions of the main point data storage section 1012 shown in Fig. 10, described above, so that the contents of the main point recording time field 1207 in a received telephone call data record can be utilized to extract the data of the main points from the telephone call contents field 607 of that telephone call data record.

In that way, in addition to transferring the contents of a telephone call, if recording of main points of the telephone call has been performed, it is not necessary to transfer the actual voice data of the main points.

Instead, only the respective time durations which elapse from the start of the telephone call to the start of a main point and from the start of the telephone call to the end of the main point are transmitted to the telephone call recording apparatus 106, for each of the main points in succession. As a result, the total amount of data which must be transmitted can be reduced, and in addition, a minimal amount of memory capacity of the memory card 110 is utilized for the purpose of transmitting the main point contents.

Fourth Embodiment

A fourth embodiment of a data recording system will be described, whereby when a telephone call that is being made between a mobile telephone and an internal telephone is transferred to an internal telephone, the contents of the telephone call can be recorded, with continuity of the conversation contents being maintained.

It should be understood that in the following description of this embodiment, the term "transferring a telephone call" is used with its generally accepted meaning, i.e., that of transferring a telephone connection, rather than or transmitting the contents of a telephone call. For example, if a telephone call is being made between a telephone A and a telephone B, and a connection is then made between the telephone B and a telephone C (e.g., with the connection between the telephone A and telephone B held in a waiting condition until the connection has been established between the telephone B and a telephone C) then this will be referred to as "transferring that telephone call from telephone A to telephone C".

The overall configuration of the mobile telephone 101 of this embodiment is similar to that of Fig. 1, but with the mobile telephone control section 203 of the fourth embodiment having a function for attaching call transfer

indication information to a stored telephone call data record, as described in the following

A telephone call recording apparatus 106 of this system, as shown in Fig. 14, consists of a switchboard 5 communication control section 1401 which performs control of communication performed via the switchboard 104, a gateway communication control section 1402 which performs communication control of the gateway 107, a telephone call recording section 1403 for applying telephone call data recording to the internal telephone 105 and for storing the resultant data, a telephone call recording apparatus 10 1404 which performs overall control of the telephone call recording apparatus 106, and a telephone call data matching judgement section 1405 which functions, 15 when recorded telephone call data are received from a memory card 110, to judge whether these data and recorded telephone call data which are held in the telephone call recording apparatus 106 are data of the same telephone call, with transfer of that telephone call having occurred.

20 Fig. 15 shows an example of the data recording format used for storing the data of a telephone call in the memory card 110 and in the telephone call recording apparatus 106, with this embodiment. In Fig. 15, numeral 1507 designates 25 a call transfer designation field, into which predetermined data (referred to in the following as a call transfer

designator) can be inserted for indicating that the recorded telephone call contents are those of a call which has been transferred. The contents of the other fields are as described for the first embodiment, as shown in Fig. 6.

5 The operation of this data recording system embodiment will be described for the case in which a telephone call that is being made between a mobile telephone 101 and an external telephone 111 is transferred by the mobile telephone 101 to an internal telephone 105. It will be
10 assumed that after the telephone call is started between the mobile telephone 101 and external telephone 111, recording of the contents of the telephone call is started. These contents are thereby saved as a telephone call data record, as described above for the first embodiment. If
15 that telephone call from the mobile telephone 101 is then to be transferred to a internal telephone 105 (i.e., the telephone communication connection is to become between the external telephone 111 and internal telephone 105) then the mobile telephone control section inserts the
20 aforementioned call transfer designator information into the call transfer designator field 1507. The mobile telephone 101 then sets the connection to the external telephone 111 in a waiting condition, until transfer of the telephone call to the aforementioned internal telephone
25 105 has been completed.

When the switchboard 104 receives the transferred telephone call from the external telephone 111 via the public telephone network 103, it notifies the telephone call recording apparatus 106 that a call is being transferred to an internal telephone 105. The telephone call recording apparatus 106 then begins recording of the telephone call between the external telephone 111 and that internal telephone 105. At this time, the telephone call recording apparatus control section 1404 receives notification of the call transfer from the switchboard communication control section 1401, and issues an instruction to the telephone call recording section 1403 to start recording of the telephone call, while at the same time notifying the telephone call recording section 1403 that the call which is being recorded is a transferred telephone call. When the telephone call recording section 1403 receives this instruction to begin recording of a transferred telephone call, it begins to generate a telephone call data record having the format shown in Fig. 15, with a call transfer designator inserted into the call transfer designator field 1507, then executes processing to record the telephone call data contents in the field 607 of that telephone call data record.

After recording of the transferred portion of the telephone call by the telephone call recording apparatus

106 has ended, when the memory card 110 is then removed
from the mobile telephone 101 and inserted into a computer
109, the telephone call data record stored in the memory
card 110 is transmitted via the gateway 107 to the
5 telephone call recording apparatus 106. The telephone call
recording apparatus control section 1404 then first
examines the call transfer designator field 1507 and
thereby determines that the received data are those of the
initial portion of a telephone call, which ended by being
10 transferred. The telephone call recording apparatus
control section 1404 then sends to the telephone call data
matching judgement section 1405 an instruction to analyze
the telephone call data records which are held in the
telephone call recording section 1403. The telephone call
15 data matching judgement section 1405 thereby detects that
there is a telephone call data record in which the call
transfer designator field 1507 contains the call transfer
designator, and thereby assumes that this data record
contains the final portion of a telephone call, i.e.,
20 which started by being transferred.

When it is such a transferred telephone call data
record is found, the telephone call data matching judgement
section 1405 then compares the contents of the opposite
party identifier field 602 of that data record, held in
25 the telephone call recording section 1403, with the

contents of the opposite party identifier field 602 of the telephone call data record which has been received from the mobile telephone 101, to detects whether the contents of these two fields 602 are identical. If this matching is

5 found to occur, then the telephone call data matching judgement section 1405 performs analysis to determine whether the contents of the telephone call end time field 605 of the telephone call data record received from the memory card 110 matches the contents of the telephone call

10 start time field 604 in the corresponding telephone call data record held in the telephone call recording section 1403. If the contents of these fields are found to match (i.e., recording of the data record held in the telephone call recording section 1403 started at the time when

15 recording of the data record sent from the mobile telephone 101 ended) then this indicates that the recorded telephone call data held in the telephone call recording section 1403 are data of those of a final portion of a transferred telephone call, with the data of the first portion of that

20 telephone call having been stored in the memory card 110. In that case, the telephone call data matching judgement section 1405 instructs the telephone call recording section 1403 to combine these two sets of data, i.e., to link the start of the recorded voice data held in the telephone call

25 contents field 607 of the telephone call data record held

in the telephone call recording section 1403 with the end of the recorded voice data held in the telephone call contents field 607 of the telephone call data record received from the mobile telephone 101. In response, the 5 telephone call recording section 1403 combines the two sets of recorded voice data in that manner, and stores the resultant data as the contents of a single telephone call.

As a result, even if a call made between a mobile telephone 101 and an external telephone 111 is transferred to an internal telephone 105, continuous recording of the 10 entire call, and storage of the resultant telephone call data, can be achieved in a very simple manner, without requiring any changes to be made in the public telephone network 103.

15 The above has been described for the case in which a call made between a mobile telephone 101 and an external telephone 111 is transferred by the mobile telephone 101 to an internal telephone 105. However it can readily be arranged that similar operation occurs for the case in 20 which a telephone call made from an internal telephone 105 to an external telephone 111 is transferred by the internal telephone 105 to a mobile telephone 101.

As can be understood from the above description of 25 embodiments, the present invention provides increased convenience to users of mobile telephones who also utilize

internal telephones, e.g., at a place of business, with the contents of telephone calls performed using the internal telephones being recorded and stored as data by a telephone conversation recording apparatus, since the invention 5 enables the contents of telephone calls performed by such a user while at a remote location, using a mobile telephone, to be acquired and stored by the telephone conversation recording apparatus in the same format as is utilized for internal telephones. Hence the user (e.g., after returning 10 to his or her place of business) can access and utilize the stored contents of a telephone call which was performed using a mobile telephone in exactly the same way as for a telephone call which was performed using an internal telephone.

15 Although the present invention has been described in the above with respect to specific embodiments, it should be understood that various modifications to these embodiments could be envisaged which fall within the scope claimed for the invention, as set out in the appended 20 claims.